Variable Stars.

Star.	R.A. h. m.	Decl. ° ′		h. m.	
U Cephei	0 52·5 ...	81 17 N. ...	Oct. 20,	2 25	*m*
			,, 25,	2 4	*m*
λ Tauri...	3 54·5 ...	12 11 N. ...	,, 20,	20 28	*m*
			,, 24,	19 20	*m*
ζ Geminorum ...	6 57·5 ...	20 44 N. ...	,, 24,	2 0	*M*
U Coronæ	15 13·7 ...	32 3 N. ...	,, 24,	20 48	*m*
R Lyræ	18 52·0 ...	43 48 N. ...	,, 21,		*M*
U Aquilæ	19 23·4 ...	7 16 S. ...	,, 26,	20 0	*M*
η Aquilæ	19 46·8 ...	0 43 N. ...	,, 21,	2 0	*M*
			,, 25,	21 0	*m*
S Sagittæ	19 51·0 ...	16 20 N. ...	,, 26,	23 0	*m*
R Sagittæ	20 9·0 ...	16 23 N. ...	,, 25,		*m*
X Cygni	20 39·0 ...	35 11 N. ...	,, 20,	2 0	*m*
δ Cephei	22 25·1 ...	57 51 N. ...	,, 23	21 0	*M*
U Cassiopeiæ ...	23 52·8 ...	50 46 N. ...	,, 26,		*M*

M signifies maximum: *m* minimum.

Meteor-Showers.

	R.A.	Decl.	
Near β Tauri	78° ...	32° N. ...	Swift.
,, ν Orionis	90 ...	15 N. ...	The *Orionids.*
,, δ Geminorum ...	106 ...	22 N. ...	Swift.
,, σ Ursæ Majoris ...	135 ...	68 N. ...	Swift.

GEOGRAPHICAL NOTES.

DR. MOHN contributes to the *Scottish Geographical Magazine* a useful summary of our knowledge of the Barents Sea, between Spitzbergen and Novaya Zemlya. The depths of the Barents Sea contrast in a marked degree with those of the Norwegian and Greenland Seas. Between Jan Mayen and Norway, and between Greenland and Spitzbergen, there are depths of upwards of 2000 fathoms, but the bottom of the Barents Sea is found at depths under 300 fathoms. The transition from the great depths in the western part of the Northern Ocean to the shallows of the Barents Sea is marked by an imaginary line drawn between Western Spitzbergen and Tromsö. Here is a submarine plateau, having on its western wall a steep declivity towards the depths of the Northern Ocean, and on its eastern wall a relatively flat sea-bottom rising slowly towards the coasts of Norway, Russia, Novaya Zemlya, and Spitzbergen, and continuing towards the north-east, with only 100 fathoms of water, to between Spitzbergen and Novaya Zemlya. The adjacent Siberian Sea is also characterized by slight depths. The Barents Sea is therefore deepest in its western part. A depreesion of upwards of 200 fathoms in depth projects from here into the middle of the sea eastwards as far as the longitude of Vardö, the part of the bottom lying further east having depths varying between 200 and 100 fathoms, but more generally averaging the latter. The 100-fathom line runs very near the Norwegian coast; here the bottom consequently descends rather quickly from the coast-line. But from Kola, on the Murman coast, the 100-fathom line stretches direct to Novaya Zemlya, and continues in a sinuous direction to the north of this twin island. Further on we find it again in higher latitudes. It incloses Bear Island, and reaches the banks of Western Spitzbergen. On the eastern plain of the Barents Sea, where the depths are mostly a little over 100 fathoms, are found some slight elevations and depressions; the form of the sea-bottom is slightly undulating. As regards the material deposited on the bottom of the Barents Sea, we have acquired some knowledge from the researches of the Norwegian North Atlantic Expedition. The specimens consist of a peculiar sort of clay, different in description from that lying on the bottom of the deep Northern Ocean. Its chief constituent is silica (quartz); it is very poor in carbonate of lime, and is characterized by the existence in it of the shells of a small animal belonging to the Foraminifera, from which our zoologists have given it the name of the Rhabdammina clay. Its colour is dark green. It is probable that this material is derived from the quartz rocks of the surrounding countries, which, by means of the rivers, tides, currents, and drift-ice, have been spread over the sea-bottom. The salinity of the water of Barents Sea is slightly lower than that of the Norwegian Sea, particularly at the surface. The temperature of the water in the Barents Sea exhibits some contrast in its southern and its northern part. The mean annual temperature of the surface is 5° C. at the North Cape, 4° on the Murman coast, from 2° to 1° C. on the west coast of Novaya Zemlya, and 1° C. at Bear Island. In the month of August—the warmest for surface temperatures—the normal temperature of the sea is 9° C. at Söröen (Hammerfest), 8° to 6° and lower on the Murman coast, 5° to 1° at Novaya Zemlya, 2° at Bear Island, and 1° at the South Cape of Spitzbergen. In March—the coldest month for surface temperatures—the temperature of the sea is 2°·4 C. at the North Cape, 1°·4 at Vardö, 0° to − 2° at Novaya Zemlya, a little above 0° at Bear Island, and 1° at the South Cape of Spitzbergen. For the whole year as well as for the warmest and the coldest months, the surface water is consequently warmest at the coast of Finmarken, and coldest in the sea between Novaya Zemlya and Spitzbergen. At the depth of 100 fathoms we have 4° C. off Hammerfest, 3° off the Tana Fjord, 2° off the Fisher Peninsula (Rybatschi Ostrow), 1° off Kola, and 0° along a line running south to north from the 70th to the 75th parallels of latitude, and east to west along the last-named parallel. Similar curves show the other isotherms for 1° to 4°. In the above-named bay, bordered by the 200-fathom line, are found temperatures of from 1° to 3° above zero. At the sea-bottom, irrespective of its depth, the temperature is distributed in the following degrees. Off and near the coast of Finmarken it is upwards of 4° from Vardö to off Hammerfest, and 5° further west. From here the temperature decreases towards the east and towards the north. The current runs in the Barents Sea as a rule along the coast of Finmarken and the Murman coast eastwards, in the eastern part of the sea northwards, and in the northern part, between Novaya Zemlya and Spitzbergen, westward. Along the east coast of Spitzbergen the current sets southwards. The warm Atlantic current, a branch of the Gulf Stream (this name being taken in its widest sense) runs along the coast of Finmarken, curves on leaving the Murman coast towards the north, and turns then to the west towards Bear Island. It fills the sea down to the bottom with its temperate water. This is warmest in the southern branch running eastwards; and it becomes by and by, further on, cooled down by the neighbouring ice-cold water with which it mixes, and which from the northern regions is driven southwards and westwards. The surface of the sea between Spitzbergen and Novaya Zemlya is always covered with drifting ice. The larger animals in the sea being the objects of capture, live on smaller animals. The development and presence of these small organisms is greatly dependent on the temperature of the water. But their presence in a certain place, and to a certain time, depends upon the oceanic currents, these being as a rule so strong, and the locomotive powers of the small animals so small, that these must follow the movements of the currents. The animals living at or on the bottom get their food brought to them by means of the currents.

DR. JULIUS RÖLL, of Darmstadt, in the course of a mission of botanical exploration in the north-west of America, made an ascent in June 1888 of a summit in the Cascade Mountains, hitherto unnamed on our maps. The peak in question is situated under long. 121° 15′ W., and lat. 47° 22′ N., between two small lakes, and about 20 miles north of Easton on the Northern Pacific Railroad. The following is taken from a short account of his excursion contributed by Dr. Röll to the current number of *Petermann's Mitteilungen.* On June 19, in company with Herr Purpus, he made his way through the primæval forest, and over rising ground to the foot of the mountain, pitching his tent at an altitude of 5500 feet. The next morning the actual summit was ascended. It is composed of melaphyr, and many pieces of agate and rock crystal were found. The steep slopes are overgrown with ceanothus bushes, maples, and pines, between which bloom yellowish-red lilies (*Lilium philadelphicum*), and species of dark-red pentstemons. Three successive summits were climbed. The highest was estimated at 7500 feet; unfortunately the exact altitude could not be ascertained, as the traveller's barometer had become useless. The rocky crest of the mountain is covered with the *Selaginella rupestris*, pentstemons, phlox, pedicularis, several saxifrages, and some low umbelliferous plants, &c. Traces of bears, mooses, and mountain sheep were observed. The following day another ascent was made, and a magnificent view of the snow-covered Mount Tacoma obtained. Some weeks later, finding that the peak he had ascended was unnamed, Dr. Röll designated it "Mount Rigi," from the resemblance to the Swiss mountain of that name.

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THE question of the influence of wind and rain in valley formation is discussed by Herr Rucktäschel in a short memoir contributed to the current number of *Petermann's Mitteilungen*, abstracted in the Proceedings of the Royal Geographical Society. The author, who has been pursuing his studies in Saxony and elsewhere, ascribes the "one-sidedness" which is observable in so many of the river valleys of Saxony to the action of rainy winds, in the absence of considerations arising from the configuration or composition of the soil. It has been observed that, in the case of most streams in this region flowing through soft sandstone, conglomerate, and diluvial soils, the east, north-east, or south-east bank presents a steep slope, while the opposite shore is flat. The cause is, according to Herr Rucktäschel, to be found in the action of the prevailing south-west, west, and north-west winds, which, heavily charged with rain, precipitate themselves almost at right angles upon the eastern sloping bank of a stream, washing away the soil in much greater quantity than from the western bank, and thus producing the one-sidedness referred to. Similar phenomena have been observed in some of the river valleys of Prussia and Bavaria. The author lays down the following conditions as necessary for the production of these effects by the westerly rain winds: (1) the soil must be composed of some loose or soft substance, (2) the valley must be eroded to a certain depth, (3) the volume of water in the stream must not be too great in proportion to that washed down the banks. For these reasons the phenomena can occur, as a rule, only along the smaller rivers, a large river; by the force of its own current, shapes its banks, and the influence of the prevailing rain winds is not so noticeable. Herr Rucktäschel visited England last summer to carry out researches there, but was unable to find any river-valleys suited for his purpose.

IT is reported from Hong Kong that the expedition of Mr. Rosset in the as yet unexplored districts of Annam, Cochin China, Cambodia, Siam, and the Laos States has been concluded. Much danger and many difficulties were encountered, but the result has been excellent, and Mr. Rosset will take back with him to Europe a valuable collection illustrative of the ethnology of the regions he has traversed. The journey was divided into three sections. The first comprised the Mekong River, the Chane and Bang-Came Rivers, to Stung-treng, in Siam, 104° to 106° long. and 13° to 14° lat. In this section the tribes of the Brouns or Bruns, the Kongs, and the Bennongs, were visited and studied. The second section of the journey as projected was from the mouth of the River Dongnai in Cochin China up to the frontier, covering the country between 104° and 106° long., and 11° and 12° lat., the special object of study being the ethnology of the Mois tribes. It was found, however, that the route was impracticable, the heavy rains and thickness of the jungle preventing the progress of the caravan, and the expedition was obliged to make a detour into the mountains of Binthuan. The third section of the journey again followed the Mekong River to Kratse, from thence branching east and north-east to the coast of Annam. Approaching Bung U the expedition followed a north-easterly direction to 13° lat. About 25 kilometres south-east of Kratse the River Pree Sé was passed, and the same river was crossed three times in the journey north-east to the coast; also a tributary river called the Sala. In this section the tribes of the Bennongs, Sliengs, Nhongs, and Ahongs were studied.

THE TEACHING OF SCIENCE.[1]

IN a Report presented to the Bath meeting the Committee gave an account of the replies they had received to a letter addressed to the head masters of schools in which elementary chemistry is taught. In this letter the Committee had asked for a report on the chemical teaching, and also for a statement as to the methods which had been found to render the teaching most effective as mental training. In commenting on these replies the Committee pointed out that the evidence which had been collected was conclusive in showing that much of the teaching of elementary chemistry is far from satisfactory, and needs to be considerably modified if it is to effect that valuable mental discipline which science teaching can afford.

The Committee are convinced that the high educational value of instruction in physical science has never been exhibited to its full advantage in most of our educational institutions. Nevertheless there exists already a considerable body of experience which proves that there is no more effective and attractive method of training the logical faculties than that which is afforded by a properly arranged course of instruction in physical science; by no other means are the powers of accurately ascertaining facts, and of drawing correct inferences from them, so surely developed as they are by the study of this subject.

Since the last meeting the Committee have been actively engaged in discussing the lines which a course of elementary instruction in chemistry should follow. The Committee were the more inclined to offer suggestions of their own, since they had learnt from the replies made to their letter of last year, by teachers in many of our well-known schools, that not only is the necessity for the adoption of improved methods fully recognized, but that teachers are anxious to receive advice and assistance in introducing them.

It cannot be too strongly insisted that elementary physical science should be taught from the first as a branch of mental education, and not mainly as useful knowledge. It is a subject, which when taught with this object in view, is capable of developing mental qualities that are not aroused, and indeed are frequently deadened, by the exclusive study of languages, history, and mathematics. In order that the study of physical science may effect this mental education, it is necessary that it should be employed to illustrate the scientific method of investigating Nature, by means of observation, experiment, and reasoning with the aid of hypothesis; the learners should be put in the attitude of discoverers, and should themselves be made to perform many of the experiments. The lessons ought to have reference to subjects which can be readily understood by children, and illustrations should be selected from objects and operations that are familiar to them in every-day life. Chemistry is particularly well adapted for affording this kind of instruction, and the Committee are of opinion that a course which is mainly chemical will be most useful in developing logical habits of thought.

Chemical inquiry involves, however, the use of various physical processes, and these are themselves of great value from the point of view from which the instruction is being given. It is also of great importance that the learners should become acquainted with the characteristic instrument of physical science, viz. measurement, and therefore quantitative processes should be largely made use of.

Having agreed as to the general principles on which a scheme of elementary instruction in chemistry should depend, the Committee gladly accepted the offer of Prof. Armstrong to draw up an account of such a scheme in sufficient detail to serve as a guide to those who have to provide such teaching. Without pledging themselves to accept all its details, the Committee consider that the scheme which Prof. Armstrong has prepared is in general accordance with their views as to what should constitute a course of elementary instruction in physical science.

With regard to the manner in which the scheme should be carried out, the Committee wish to lay stress on the following points. In order that the plan shall produce its full educational effect, the instruction should be commenced at an early age, and be extended to every child in the school. They do not desire to bring forward physical science as a substitute for any of the other principal subjects of study, but they ask that like these subjects it should be looked upon everywhere as a necessary part of education, and that it should receive a due share of the time devoted to school work. It is well known that at present science-teaching does not generally receive as much time and attention as is given to other studies. This was made clear in the Report of the Committee last year. It will be necessary to allot more time to the subject, and to employ a greater number of teachers. A teacher should not be required to give practical instruction to more than from fifteen to twenty pupils at one time, although the classes at lectures and demonstrations might be somewhat larger.

While the scheme now proposed may involve the employment of a larger number of teachers of natural science, on the other hand fittings and apparatus of the simplest description are all that will be absolutely needed, and the cost of maintenance will be relatively small.

The Committee are aware that the course of instruction now suggested is not in conformity with the present requirements of

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[1] Report of the Committee, consisting of Prof. H. E. Armstrong, Prof. W. R. Dunstan (Secretary), Dr. J. H. Gladstone, Mr. A. G. Vernon Harcourt, Prof. H. McLeod, Prof. Meldola, Mr. Pattison Muir, Sir Henry E. Roscoe, Dr. W. J. Russell (Chairman), Mr. W. A. Shenstone, Prof. Smithells, and Mr. Stallard, appointed for the purpose of inquiring into and reporting upon the present methods of teaching Chemistry.

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